

**Abstract**

A method for processing a gas containing at least hydrogen sulfide (H<sub>2</sub>S) and at least sulfur dioxide (SO<sub>2</sub>), includes the steps of contacting the gas with a liquid solvent containing at least one catalyst in a contacting stage, recovering gaseous effluent substantially containing no hydrogen sulfide and no sulfur dioxide from the contacting stage, and separating liquid sulfur from liquid solvent in a decantation zone downstream of the contacting stage. In order to remove by-products resulting from degradation of the catalyst, a liquid fraction F containing at least solvent, catalyst, sulfur and the solid by-products resulting from degradation of the catalyst is extracted from after the contacting stage. The liquid fraction F is sent to a processing stage distinct from the contacting stage where the liquid fraction F is heated to a temperature at least partially crystallizing the by-products, and the at least partially crystallized by-products separated from the rest of the liquid fraction F containing at least solvent. At least a stream F<sub>1</sub> comprising solvent, catalyst and sulfur and substantially free of the by-products and a stream F<sub>2</sub> mostly comprising the by-products are recovered.